

REMARKS

Claims 1 to 12 are pending. The support for claim 1 is found in the published application at [0064] and in Claim 4 as originally presented. Claims 2, 4, 7 and 12 have been also amended to address the grammatical informalities raised in the Office Action. No new matter has been added.

Claims 7 and 12 are objected to for certain informalities. (Office Action p. 2)

Claims 7 and 12 have been amended to correct the informality.

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waki (WO 99/52966) in view of Hendi (EP 0,790, 281 B1). (Office Action ps. 3, 6 and 7)

The present invention particularly relates to a method of producing a water-based pigment dispersion for ink-jet ink wherein a quinacridone-based pigment is used, and an ink composition for ink-jet recording. By the amendment made herein to claim 1, the solid content of the kneaded mixture during kneading is from 50 to 80% by mass. An object of the present invention is to provide an ink composition for ink-jet recording, which has excellent dispersibility and dispersion stability and is less likely to cause an increase in particle size even when allowed to stand at high temperature for a long period, and which is less likely to cause an increase in viscosity (see page 8, lines 6 to 14).

On the other hand, Waki describes that a predispersion process such as kneading is used in a process for dispersing a pigment with a thermoplastic resin, and that the thermoplastic resin may be neutralized before or after the predispersion process. Waki describes that the predispersion is carried out before the dispersion process in order to effectively grind coarse large particles and to give uniform fine particles in the subsequent dispersion, and that the predispersion of the pigment and the thermoplastic resin can be carried out by using a pore-shearing type mixer.

Applicants note that there is no particular restriction on the temperature and time for the predispersion of Waki. The specific composition and method for the predispersion are simply

described in Examples. Although the Examples disclose the predispersion, the composition and the method for the predispersion vary throughout the Examples. As such, Waki does not disclose or suggest a general method or a specific composition range to be widely suitable for the predispersion regardless of the type of the pigment.

Furthermore, Applicants note that ***a quinacridone-based pigment is not used in the Examples.*** Because the solid contents of Examples 1 and 2 (wherein the mixture is dissolved and kneaded by a kneader) represent high values, i.e. 95% by mass and 98% by mass, and the solid contents of Examples 3 and 4 (wherein the mixture is kneaded by using a butterfly mixer) represent low values, i.e. 47% by mass and 43.5% by mass, even if the pigments in the Examples were replaced with a quinacridone-based pigment, the ink produced by said modification would, *at best*, be a water-based ink for writing materials, a printing ink, a water-based paint, or a paint for color filter as in the Examples. That is to say, even if one of ordinary skill in the art were to replace the pigment, they would have had no reasonable expectation of success in preparing an ink for ink-jet recording as disclosed in the claimed invention. Accordingly, it would not have been obvious for a skilled person in the art to employ one of the various predispersions as disclosed in Waki to produce a the water-based pigment dispersion for ink-jet ink.

Furthermore, in the claimed invention an alkali metal hydroxide is used in the kneading process and the solid content of the kneaded mixture during kneading is from 50 to 80% by mass. ***By kneading the kneaded mixture having a high solid content in the presence of the alkali metal hydroxide, carboxyl groups in the styrene-based resin are neutralized with the alkali metal hydroxide. As a result, excellent water dispersibility is attained*** (see page 18, lines 3 to 5). A large shear force can also be applied to the mixture during kneading and the quinacridone-based pigment is crushed into fine particles, while the surface of the fine particles are coated with the styrene-based resin swollen by the humectant (see page 23, line 13 to page 24, line 1).

Applicants note that when the solid content is less than 50% by mass, sufficient kneading may not be conducted and the pigment may not be crushed sufficiently, since the viscosity of the mixture decreases. When the solid content is more than 80% by mass, kneading may be carried

out with difficulty and the colored kneaded mixture may not be easily dispersed in the aqueous medium in the dispersing process (see page 28, line 21 to page 29, line 10).

To the contrary, Waki does not disclose or suggest the predispersion having such solid content. As stated above, none of the Examples disclose the predispersion having the solid content of from 50 to 80% by mass. The Office Action alleges that it would have been obvious to have lowered the solids content of the disclosed kneading mixture by increasing the solvent content so as to further reduce the kneading viscosity in order to make it easier to knead the mixture and to obtain more uniform distribution of the pigment particle size (see pages 6 to 7 in the Office Action). However, Applicants contend that ***a kneaded mixture has totally different state of from liquid to clay solid depending on the solid content.***

Furthermore, in the present invention, it is ***essential that the colored kneaded mixture is kneaded in the presence of the alkali metal hydroxide.*** An alkali metal hydroxide is essential since it can maintain a neutral status without being volatilized. Although the kneaded mixtures in the Examples 1 and 2 of Waki also have extremely high solid content, Waki does not teach or suggest the use of an alkali metal hydroxide. As stated above, the Office Action alleges that it would be obvious to replace the organic amine with the alkali metal hydroxide since organic amine and alkali metal hydroxide are functionally equivalent. However, Applicants contend that the ***organic amine in Waki has an additional function of adjusting pH and finishing the cross-linking reaction by being evaporated from the dispersion in addition to simply neutralizing the carboxylic acid groups of the resin as a base.*** As such, one of ordinary skill in the art would ***not consider an organic amine and an alkali metal hydroxide functionally equivalent.*** Thus, one of ordinary skill in the art would have had no apparent reason to replace the organic amine of Waki with an alkali metal hydroxide.

Hendi does nothing to rectify the deficiencies of Waki. Hendi describes that

[0005] (T)he present invention relates to the discovery that the presence of ***both*** a phthalimidomethylquinacridone derivative and a pyrazolylmethylquinacridone derivative in a pigment composition that is dispersed unexpectedly results in a reduction in viscosity which is greater than could have been expected based on the prior art. The present invention further relates to the discovery that the

incorporation of **both** a phthalimidomethylquinacridone derivative and a pyrazolylmethylquinacridone derivative into a coating composition unexpectedly results in a coating that has improved saturation. (emphasis added)

As such, it would be clear to one of ordinary skill in the art that, the improved benefits described by Hendi are not attributed to either compound but only to the combination of **both** compounds.

As such, one of ordinary skill in the art upon reviewing Waki and Hendi alone or in combination, would have no motivation to arrive at the water-based ink composition for ink-jet recording according to the present invention. From the combination of the art there is still no expectation of success in achieving the water-based ink composition for ink-jet recording according to the claimed invention having the properties of excellent dispersibility and dispersion stability; less likelihood to cause an increase in particle size even when allowed to stand at high temperature for a long period; and less likelihood to cause an increase in viscosity.

Accordingly, Applicants respectfully contend that none of Claims 1-12 would have been obvious to a skilled person in the art over the cited references because of claimed chemical differences. Accordingly, Applicants respectfully request reconsideration and withdrawal of all rejections under 35 U.S.C. § 103.

CONCLUSION

In view of the remarks made herein, the application is in condition for allowance. Favorable reconsideration of the application and prompt issuance of a Notice of Allowance are respectfully requested. If a telephone conference with Applicant's representative would be helpful in expediting prosecution of the application, Applicant invites the Examiner to contact the undersigned at the telephone number indicated below.

Applicant believes that no additional fees, other than the fee for the two-month extension of time, are required in connection with this paper. Nevertheless, Applicant authorizes the Director to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to Deposit Account No. 04-1105, under Order No. 80390(47762).

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Respectfully submitted,

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